

Boston Drug Analysis Laboratory

Massachusetts Department of Public Health
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Welcome to the Boston Drug Lab!

◆ Mission Statement:

- Identifies unknown substances for local, state and federal agencies in Massachusetts.
- Provides accurate and timely analysis.
- Provide Certificates of Analysis.

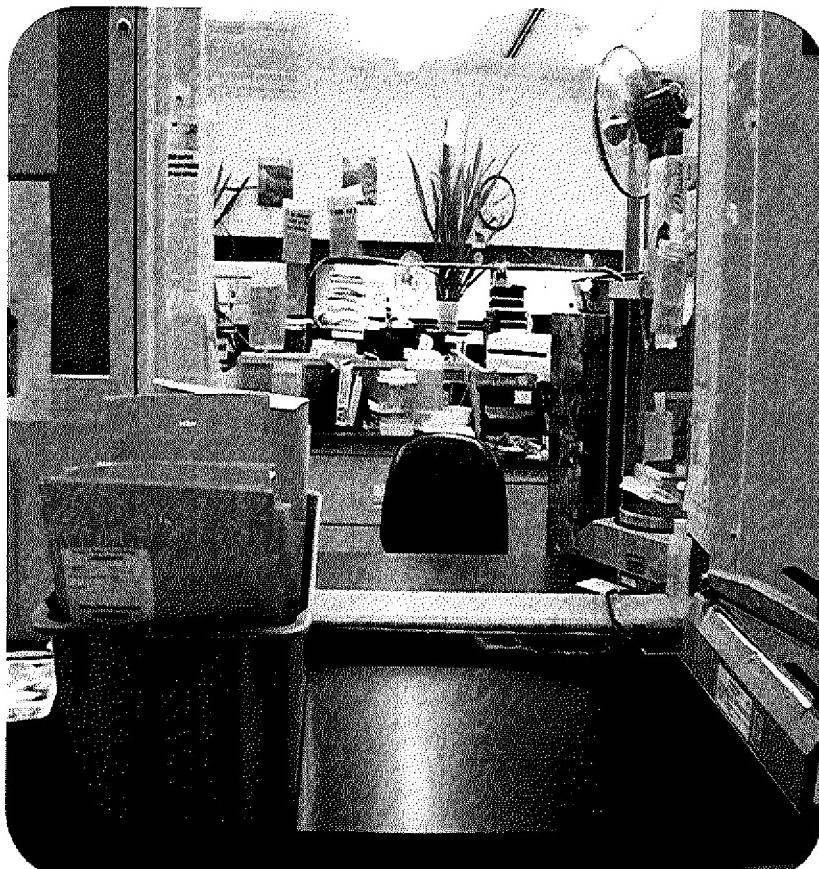


Melendez-Diaz

- ◆ Trials scheduled: 3065
- ◆ # of chemist's appearances: 447

Impact of Melendez-Diaz from June 26th, 2009 through
March 31st, 2011 on the Boston Drug Analysis Laboratory.

Evidence Submission



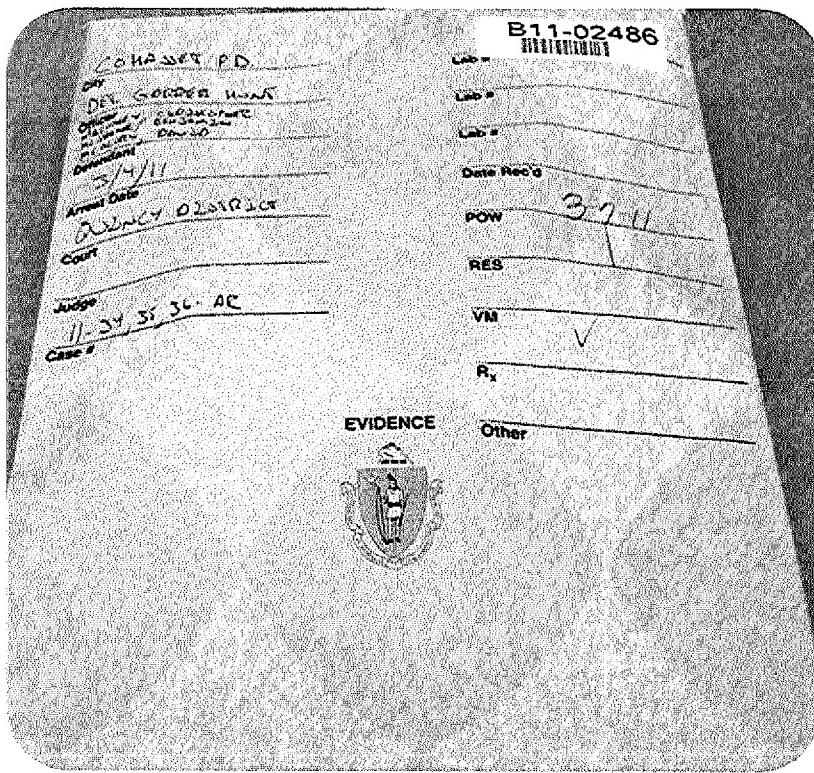
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- ◆ At the evidence window, the evidence officer will receive various types of evidence from police departments.
- ◆ Consists of many different types:
 - Substance (Cocaine, Heroin, etc)
 - Rx
 - Marijuana

Evidence Submission

- ◆ A Drug Receipt is filled out. It will contain the following information:
 - Submitting PD and officer.
 - Defendant's name (if known)
 - A description of the item(s).
 - An initial gross weight of the evidence .
 - Then each piece of evidence is assigned a laboratory number.

Evidence Submission



- ◆ The sample is received in a heat sealed and initialed plastic bag.
- ◆ The sample is placed into the manila envelope.
- ◆ A bar code with the appropriate Lab # will be adhered to a manila envelope.

Evidence Submission

| | | | |
|-------------|------------------|-------|--|
| No. | Date Analyzed: | | |
| City: | | | |
| Defendant: | | | |
| Amt: | Subst: | Cont: | |
| Date Rec: | From: | | |
| Gross Wt: | Number of Tests: | | |
| Net Weight: | | | |

- ◆ An Evidence Control Card is generated based on the information on the drug receipt.
- ◆ The control card is placed in the manila envelope and put into the safe.
- ◆ At this point , the chain of custody is with the Evidence Office

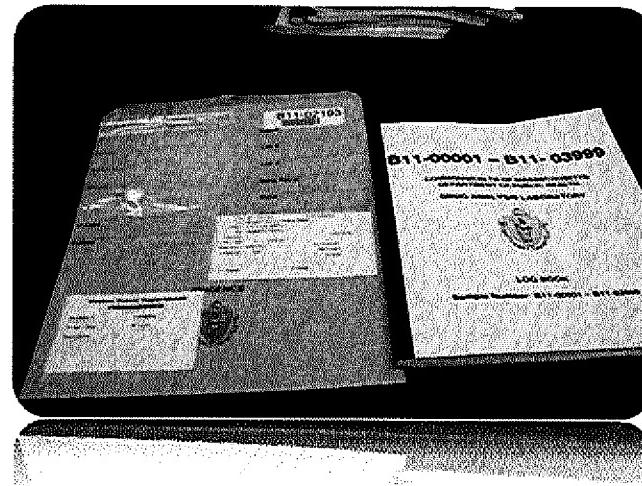
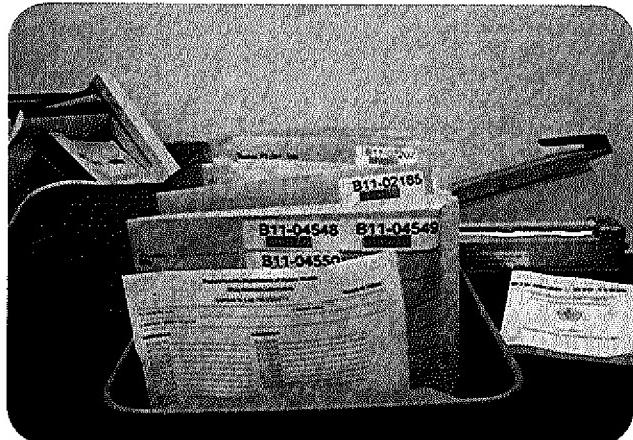
The Safe

Evidence is transferred to the safe for storage



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Case Assignments



- ◆ An Evidence Officer assigns the samples to individual chemists.
- ◆ The chemist will review the envelope, control card and the sample for accuracy. The chemist accepts custody of the sample by signing the corresponding Log Book.
- ◆ Now, the chain of custody is with the Chemist

Analysis



- ◆ The Chemist will analyze the substances according to the Lab Policies and Procedures.
- ◆ The Lab follows the recommendation set forth by the Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG).
- ◆ There are different procedures based on the type of sample being analyzed (i.e. a suspected cocaine sample vs. a suspected marijuana sample)

Preliminary Analysis - Substance

- ◆ QC of Balance/s

- ◆ QC of Reagents

- ◆ Drug Analysis (Powder)
Sheet

► Chemist's hand notations in regards
to the sample

| | |
|---------------------------|----------------|
| DRUG POWDER ANALYSIS FORM | |
| Sample # | Acronym |
| No. of samples tested | Preparation |
| Chemical Description: | |
| Physical Description: | |
| Mineral | 111112-502 |
| Organic | 112345-523 |
| Preliminary Test Results | |
| Spectroscopic | |
| Cobalt | Chloride |
| Thiosulfate (+) | TNT (-) |
| Manganous | Silver Nitrate |
| Froehling's | Other Tests |
| Möller's | |
| SCANS CONFIRMATION TEST | |
| RESULTS | 111112-502 |
| MS | KAC |
| OPERATOR | |
| DATE | 5-10-10 |

Preliminary Analysis - Substance

Weight

- ◆ The weight of the sample can be determined by two methods:

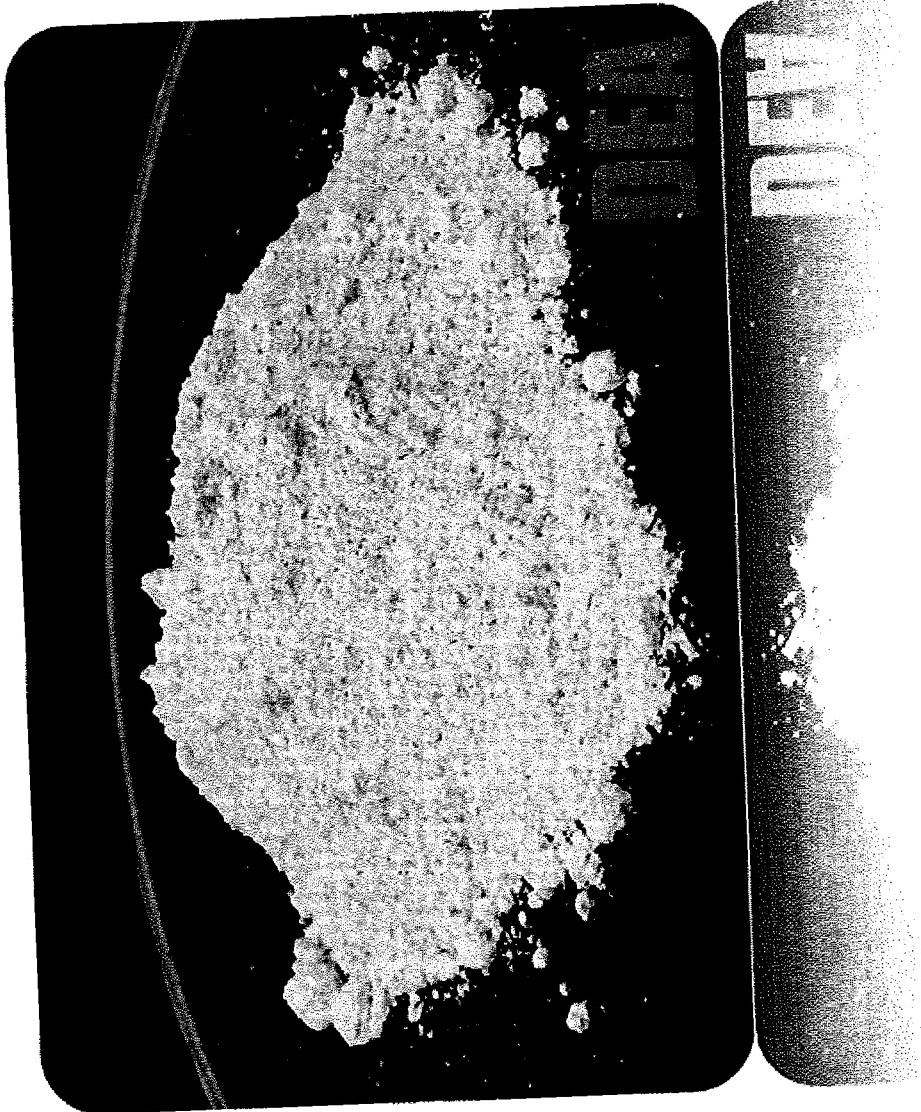
- Indirect
- Direct

- ◆ Sampling Plan

- 10%
- Square Root
- Hypergeometric



Preliminary Analysis – Heroin

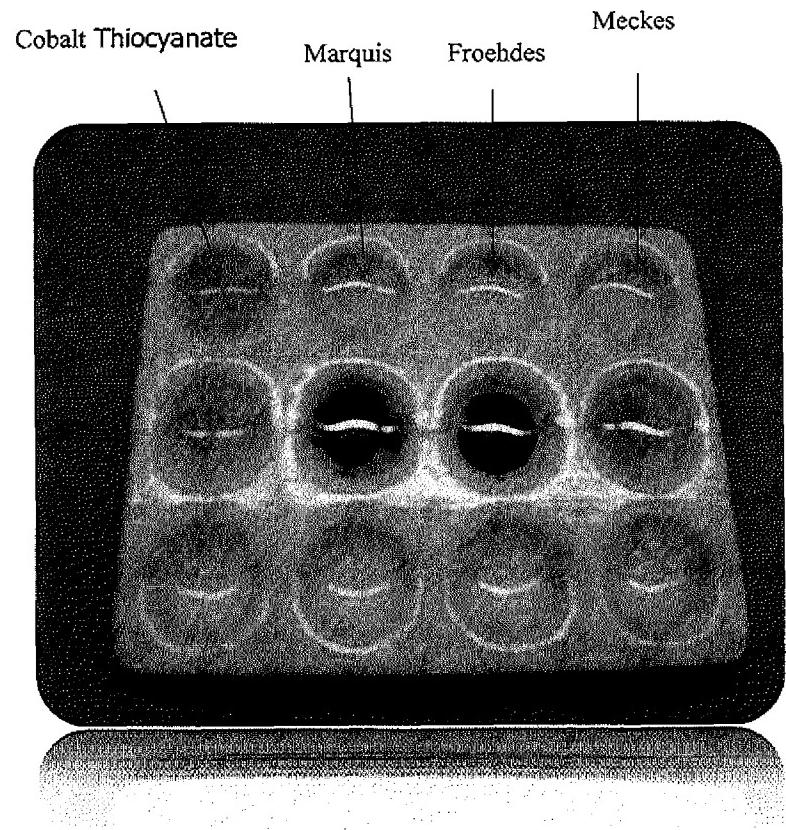


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Preliminary Analysis – Heroin

Spot Test

- ◆ Spot tests are performed on the substance.
 - ✓ A total of four spot tests
 - Cobalt thiocyanate
 - Marquis
 - Froehdes
 - Meckes
 - ✓ A purple color change for the Marquis and Froehdes, and a green color change for the Meckes, indicates that the substance may be presumptively positive for an opiate.



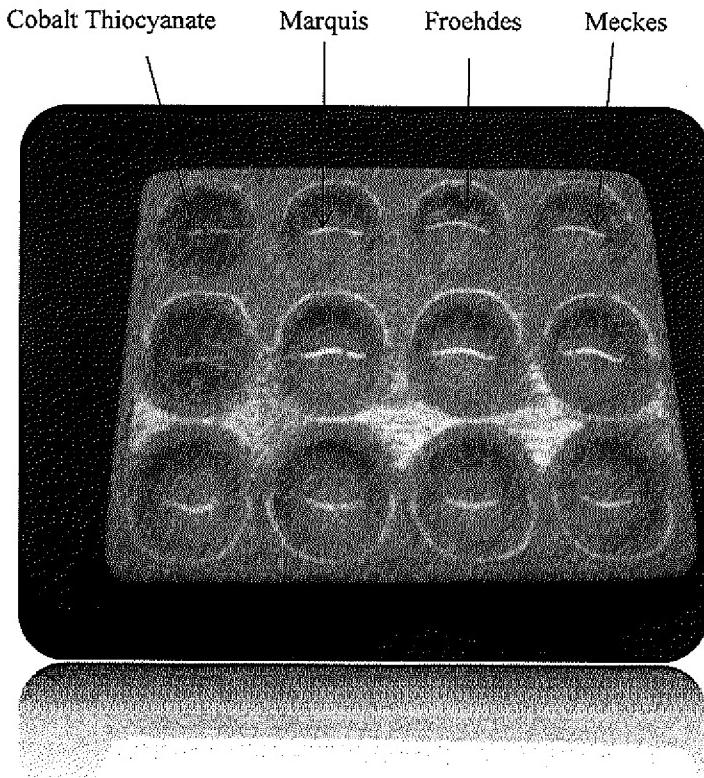
Preliminary Analysis – Cocaine



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Preliminary Analysis – Cocaine

Spot Test

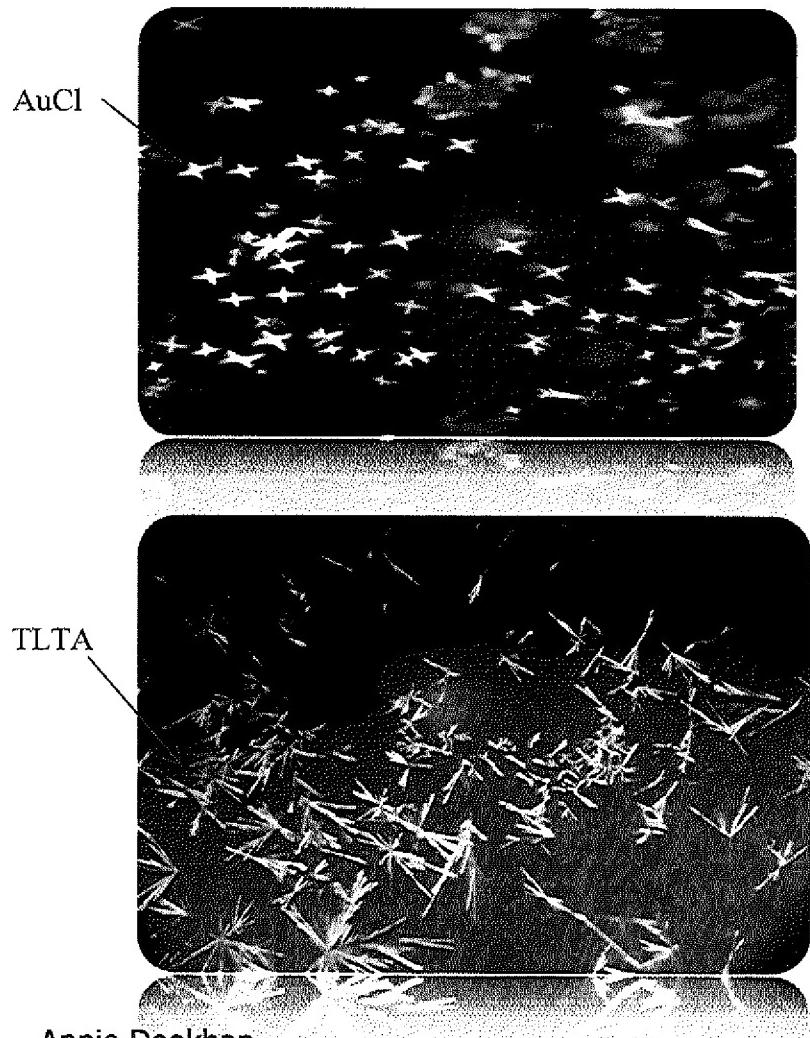


- ◆ Spot tests are performed on the substance.

- ✓ A total of four spot tests
 - Cobalt thiocyanate
 - Marquis
 - Froehdes
 - Meckes
- ✓ A blue color change in the cobalt thiocyanate indicates that substance may be presumptively positive for cocaine.

Preliminary Analysis – Cocaine

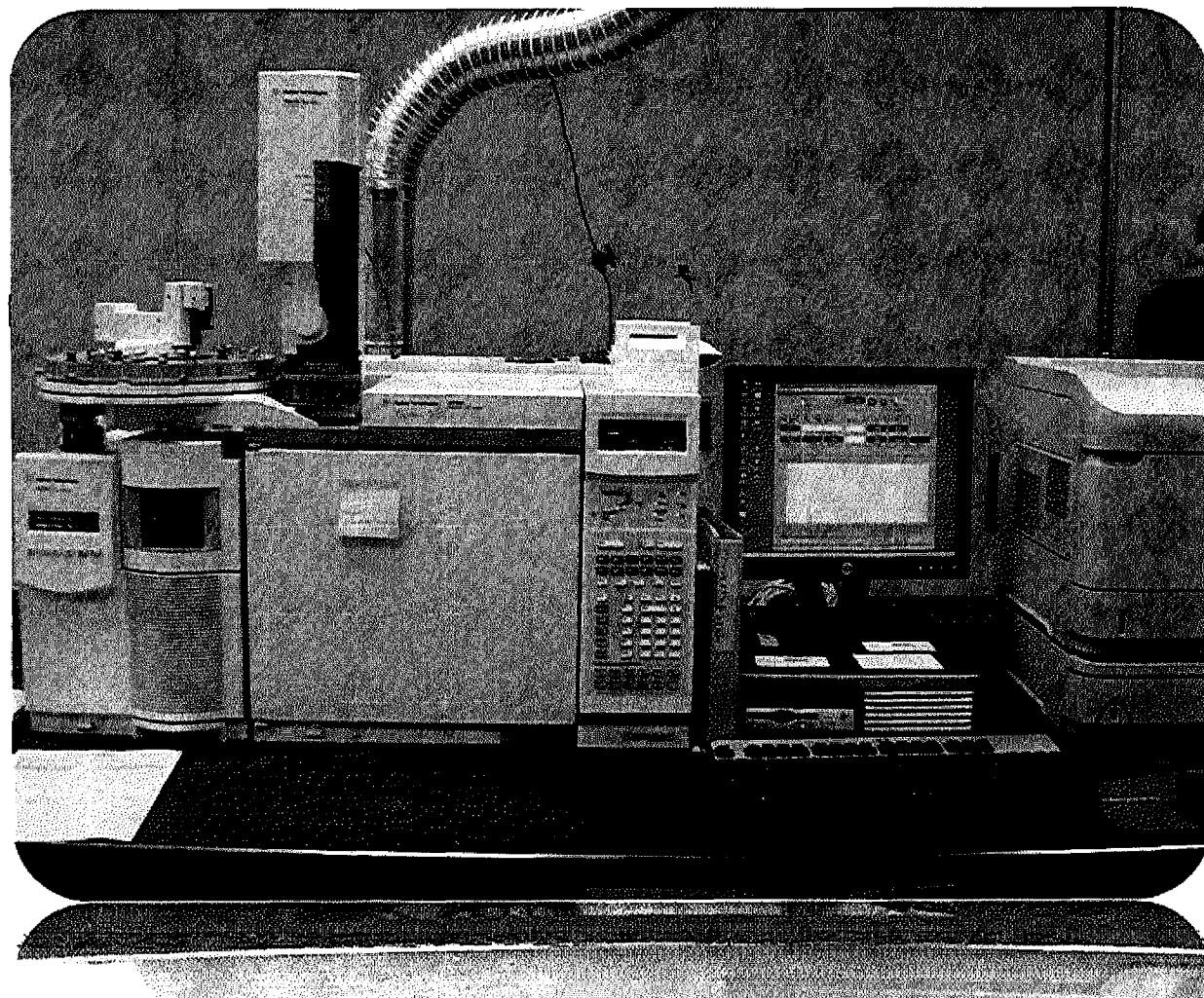
Microcrystalline Tests



- ◆ Performed if there is a positive cobalt thiocyanate test .
- ◆ Two microcrystalline tests (Structural ID)
 - Gold chloride (AuCl)
 - di-p-toluoyl-l-tartaric acid (TLTA)
- ◆ When these reagents are added to cocaine samples , they will form specific types crystals that can be viewed under a microscope.

Confirmatory Analysis

Gas Chromatography/Mass Spectrometry (GC-MS)

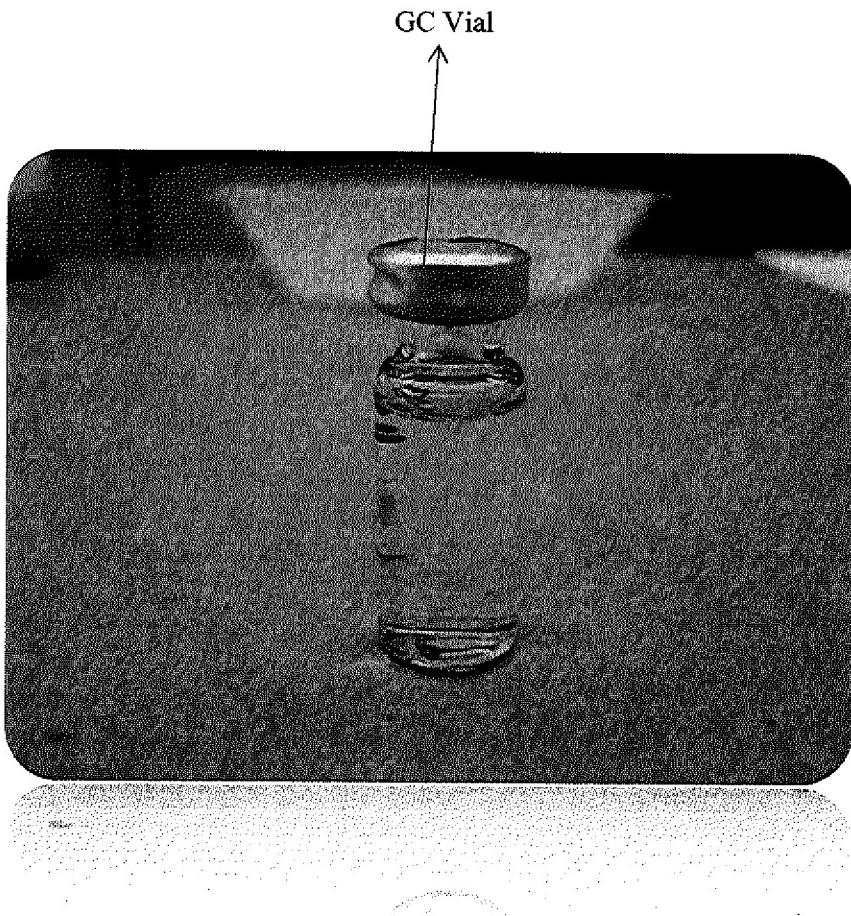


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Confirmatory Analysis

Gas Chromatography/Mass Spectrometry (GC/MS)

- ◆ For substances from Class A to D, samples are submitted to GC/MS for confirmatory testing.
- ◆ A small amount of the substance is placed in a vial and dissolved with a solvent (methanol).
- ◆ An aliquot of the sample is used when injected into the GC/MS.
- ◆ The instrument separates the components of the substance and then breaks it down into ions, and a chromatogram is generated.
- ◆ The Confirmatory Chemist analyzes the chromatogram of the unknown sample against a known standard to determine the presence of the illicit narcotic.



Analysis – Marijuana

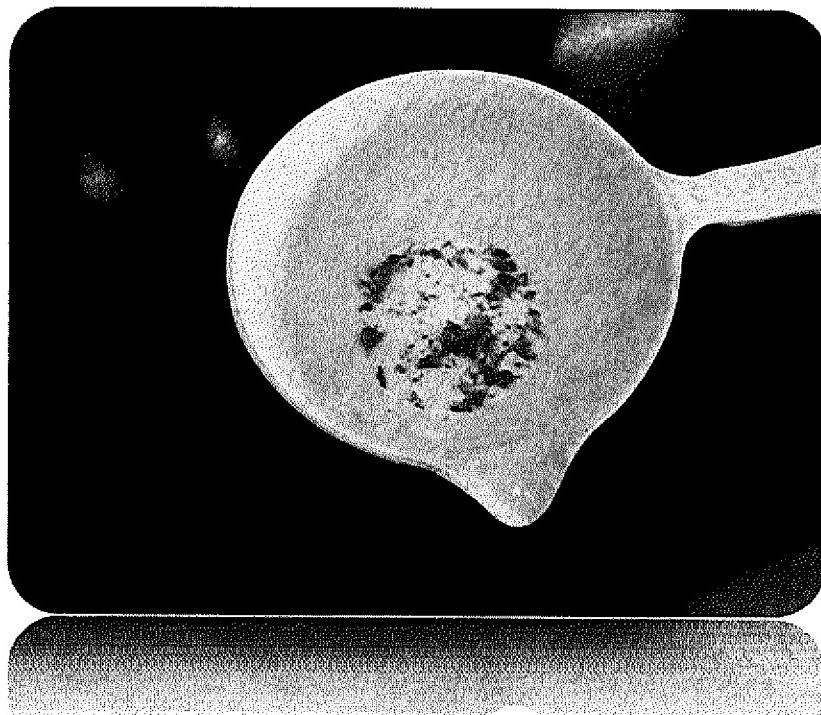


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Analysis – Marijuana

Macroscopic identification

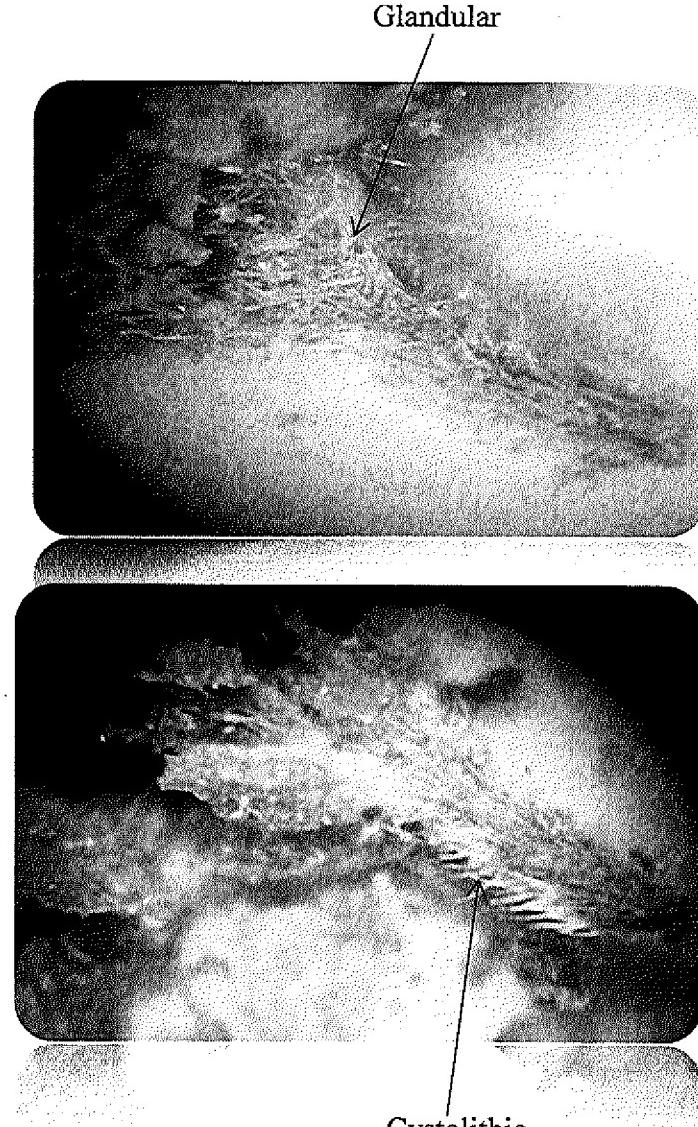
- ◆ A macroscopic examination of the sample is done.
- ◆ Identify serrated leaves and morphological characteristics.
- ◆ Does it look like green, leafy, vegetable matter?



Analysis – Marijuana

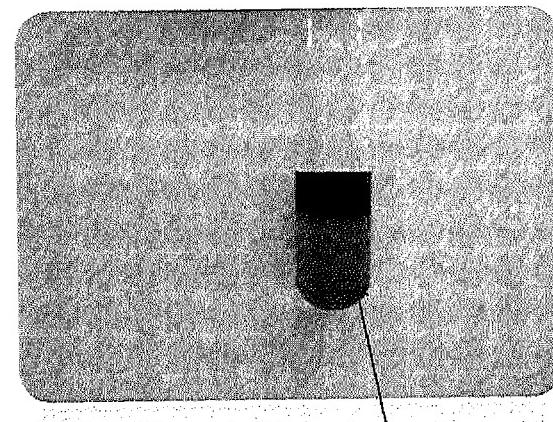
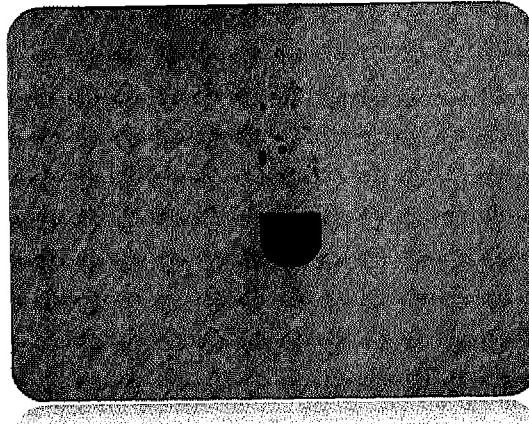
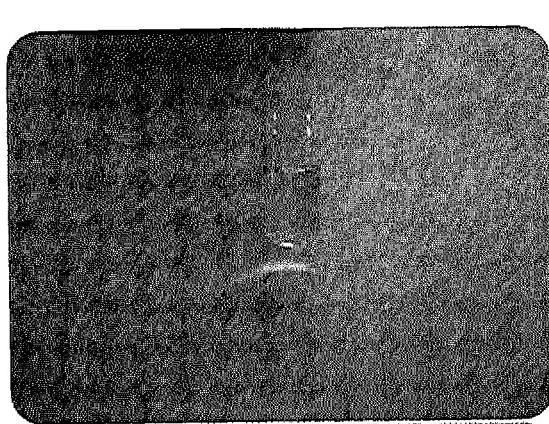
Microscopic identification

- ◆ A microscopic identification of the sample is performed using a stereoscope.
- ◆ Identify two particular types of hairs. (Structural ID)
 - Cystolithic (bear claws)
 - Glandular



Analysis – Marijuana

Modified Duquenois Levine Test



- ◆ A Modified Duquenois Levine test is performed.
 - QC of Reagents
 - The chemist will perform a series of extractions during this test
 - The transfer of purple color from one layer to another, indicates the presence of THC

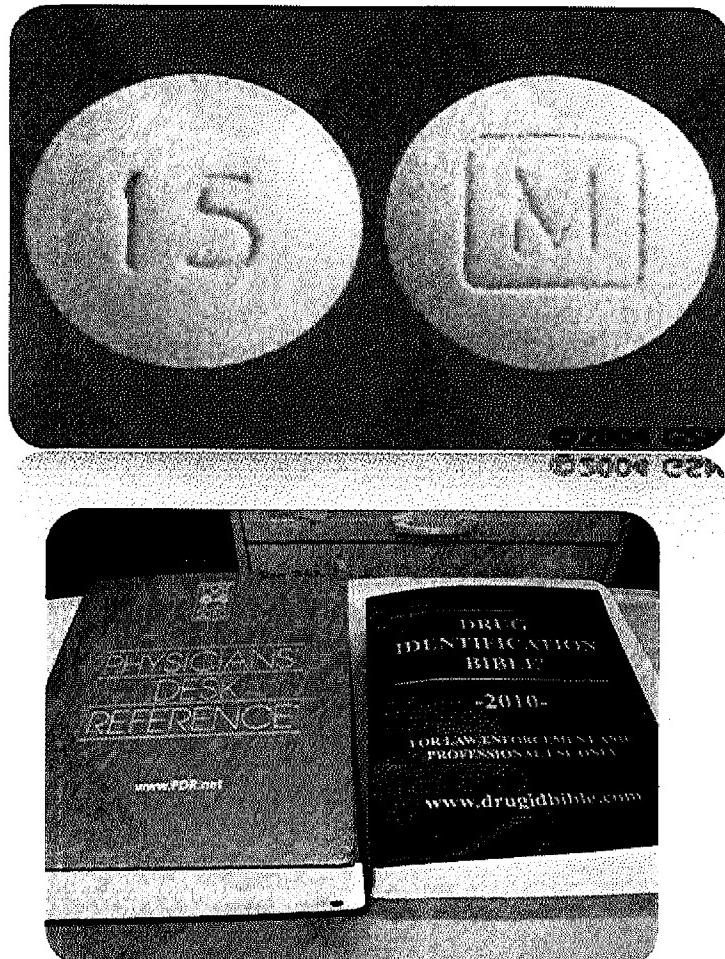
Analysis – Rx



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Analysis – Rx

- ◆ Examine & document each pill for identifying marks (shape, color, imprint).
- ◆ Number of pills and the net weight is documented.
- ◆ Compare the ballistics to those in a pharmaceutical reference .
 - Micromedex Software (licensed)
 - Drug Identification Bible
 - Physician's Desk Reference (PDR)
- ◆ Those substances containing an active ingredient from Class A to D will undergo confirmatory testing by GC/MS.
- ◆ Class E substances are confirmed by appearance and labeling .



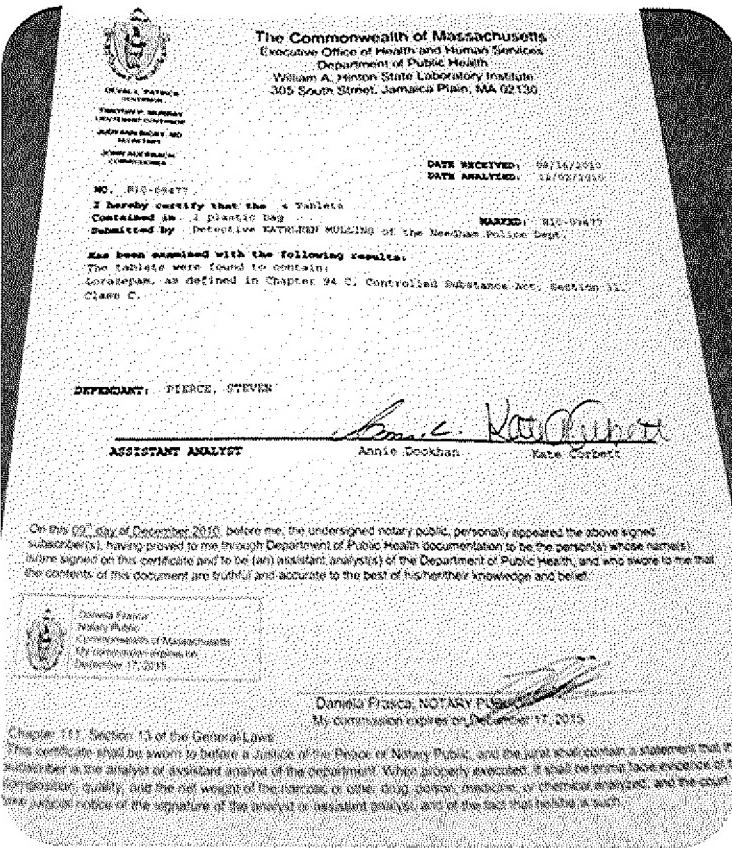
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Evidence Control Card

- ◆ The evidence control card is filled out by the chemist/s.
 - Results
 - Net Weight
 - Date analyzed
 - Chemist/s who performed the analysis
- ◆ Card is returned to the evidence office.
- ◆ A Certificate of Analysis is generated based on the information on the control card.

| | |
|-------------------------------|------------------------|
| No. B11-01559 | Date Analyzed: 4-13-11 |
| City: Quincy Police Dept. | |
| Officer: Detective BRIAN COEN | |
| Def: MUTTS, JAMES | |
| Amount | Subst: SUB |
| No. Cont: 1 | Cont: paper fold |
| Date Rec'd: 02/09/2011 | |
| Gross Wt.: 2.93 | No. Analyzed: |
| Net Weight: 0.05 | |
| # Tests: 6/20 | |
| DDJR | |
| Prelim: Cocaine C | Findings: Cocaine |

Certificate of Analysis



- ◆ A Certificate of Analysis is generated for each Lab#. It is reviewed and signed by the chemist/s.
- ◆ The first signature is the custodial chemist, who maintains custody of the sample and performs the preliminary analysis & net weight. The second signature is the chemist who performs confirmatory testing.
- ◆ Then the Certificate is notarized.

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Evidence Returns



- ◆ Upon completion, the sample and the Certificate of Analysis is placed in the manila envelop. Both the envelope and the control card will be returned to the safe.
- ◆ Evidence and drug certificates are returned to the appropriate law enforcement agency.

Court

Discovery Packets

- ◆ ADAs may request, in writing, a discovery packet from the lab via email or fax.
- ◆ Include the Lab # on the discovery request.
- ◆ 14 days advance notice for discovery packets.
- ◆ Discovery packets will consist of:
 - Drug Receipt
 - Evidence Control Card
 - Chemist Drug Analysis Sheets
 - GC/MS Analytical Data

Court

Summons

- ◆ Summons can be emailed, faxed or mailed to the Lab.
- ◆ Include the Lab # on the summons.
- ◆ 30 days advance notice for summons.
- ◆ 48 hours verbal or email follow-up, if needed to appear for court.